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GENERAL SCIENCE.—*Some thoughts on old age.*[1] ERWIN F. SMITH, Department of Agriculture.

First of all: I thank you for the great honor you have done me. I have not attended the meetings of this Society very often in recent years because I have more things to do than formerly and especially because I have many things to finish and not much time left in which to finish them. My interest, however, remains the same. You are to be felicitated on your wonderful growth. I can remember when all the botanists of Washington might be gathered around one small table. That was 30 years ago. Now we fill a great banqueting room, and the end is not yet. I congratulate you especially on broadening out, so as to include research women in your membership. I am certain you will not regret it.

The Psalmist said: "The days of our years are three score years and ten: and if by reason of strength they be four score years, yet is their strength labor and sorrow, for it is soon cut off, and we fly away."

Another said: "When thou wast young, thou girdest thyself and walkedst whither thou wouldst: but when thou shalt be old, thou shalt stretch forth thy hands, and another shall gird thee, and carry thee whither thou wouldst not."

And the Preacher said: "All is vanity."

These are rather gloomy views of old age. I like better the view of Confucius. In recent years I have often thought of what is said in the Analects:

"The Duke of She asked Tsze-loo about Confucius and Tsze-loo did not answer him.

[1] Address delivered at the annual dinner of the Botanical Society of Washington, March 4, 1924.

"The Master said: 'Why did you not say to him—He is simply a man, who in his eager pursuit of knowledge, forgets his food, who in the joy of its attainment forgets his sorrows, and who does not perceive that old age is coming on?' "

Like the good master, I have been so happy in my work and so absorbed in it that I have not heeded the approach of age. One of my first intimations was when Whetzel, in his *History of Phytopathology*, discussed whether I belonged to the nineteenth century or the twentieth. Another intimation is such a program as this tonight.

Dr. Osler said a man should be chloroformed when he reached 60. Perhaps he was right; certain men should. We should now be in the League of Nations, no doubt . . . . . I will let *you* finish the sentence. But Dr. Osler was only joking. He loved to joke and mystify, and in this case he must have chuckled hugely when the newspapers took him so seriously. Some of the best work of the world has been done by men over 60, as he knew very well. Elihu Root at 79, Dr. Wiley at 80, Dr. Keen at 84, and ex-President Eliot at 90 are still intellectually vigorous; and the world can ill afford to spare any one at 60 who is good for 80 or 90, and is not rotten timber. These four men, and I could name many others, have done more work since they were 60 than most men do in a lifetime, and have done it better. Wiley got the Pure Food bill through Congress after he was 60. Senator Morrill got through Congress the Land Grant Act establishing agricultural colleges when he was 63, and the second Morrill Act, increasing research appropriations for the same, when he was 78. Tennyson wrote his great triology, *Queen Mary*, *Harold*, and *Becket* after he was 65 and *Crossing the Bar* in his 81st year. Goethe studied Persian and wrote the *West-Oestliche Divan* when he was 65 and completed *Faust* when he was 82. Joffre was 63 when he won the battle of the Marne. Clemenceau was 65 when he became premier of France, and 79 when, with Woodrow Wilson and Lloyd George, he made the Treaty of Versailles.

From these remarks you may infer that I do not look kindly on the two bills now in Congress, one making the retirement age 60 and the other 65. They are engineered bills, designed to help individuals who desire promotion, and not to help the service. If you feel as I do, tell your congressman. Fifty is too long to keep some men in service, but why apply one yardstick to all? There are plenty of ways already of eliminating worthless individuals, and even those who are not worthless.

Tennyson makes the old Ulysses say:

> For my purpose holds,
> To sail beyond the sunset, and the baths
> Of all the western stars, until I die.

This is both good poetry and good philosophy.

Browning said in *Rabbi Ben Ezra:*

> Grow old along with me!
> The best is yet to be,
> The last of life for which the first was made.
> * * * * * *
> Youth shows but half: trust God: see all, nor be afraid!

I was very fond of quoting this once, but I was much younger then. Now it seems to me a part of that crass optimism Browning loved to indulge in. Personally, I do not contemplate old age with any great degree of pleasure. I envy those saints who can be ill and yet cheerful. They are usually women who have become confirmed invalids. They set noble examples, God bless them, which the rest of us may admire, even if we cannot imitate. But to be: "Sans teeth, sans eyes, sans taste, sans everything," as Shakespeare puts it, is hard to contemplate with equanimity. If, like Ulysses, one could work to the end and then die quietly without any fuss, old age would not be so bad. Nature meant us, I think, to drop off the tree of life like ripe apples from their twigs, but most men and women die prematurely with a vast deal of discomfort. We have not yet learned how to live, or how to die comfortably.

Here are some recipes for old age deferred. I thought some of you would be glad to have them.

First: Select your ancestors. This is the *best* one. I am sorry it is not more practicable. You are in for it personally and can't help yourself, but you may help your descendants tremendously by mating only into long-lived families. Especially, keep out of families with a history of tuberculosis and cancer. A good inheritance is certainly an immense factor in longevity, probably the greatest single factor. I realize it more and more. Almost all very old people come of centenary stock. Many of them abuse their bodies with tobacco and strong drink and yet live on and on. One of my great grandfathers, who died at 97, told me he had chewed tobacco for 90 years. If he had been temperate, I shudder to contemplate how long he might have lived, especially as he died of cancer of the cheek, undoubtedly due to tobacco. Smokers and chewers take warning!

Second: Avoid excesses. This recipe is practicable but more or less difficult, depending on the nature of one's inheritance and on his environment, that is, on his temptations. A fine ambition, hard work, and a pure love are strong safeguards. Good books and good company are other protections. Religion is another. Pitch will stick to whomsoever handles it. "Have no friends not equal to yourself," said the wise Confucius. He also said, "If a man will be virtuous one day, I have not known his strength to fail him," and by this he meant that we have to live and strive against the ape and the tiger in us *only one day at a time!*

Third: Keep cheerful, that is, don't worry. Worry kills more than work. Many persons, otherwise very lovable, are like Gretchen who was sent to the cellar to draw beer (the story is in Grimm's *Maerchen*). Since nobody reads German any more I may be permitted to tell the tale. As I recall it—it is a long time since I have read it—it runs as follows: Gretchen was sent to the cellar to draw beer. When she had turned on the spigot she happened to glance up at the ceiling and that was her undoing. She did not return. After a time, Hans, her lover, went down to see what had become of her and he did not return. Then the old woman went down and she did not return. Finally, the old man, becoming impatient and hearing a great hubbub in the cellar, went down to see what was the matter. He found them wailing and taking on as if they had lost all their friends, and, still worse, a great flood of beer was sweeping over the cellar floor. When the old man had stopped the waste of good beer and knocked a little sense into the heads of these three ninnies, he extracted from Gretchen, between her sobs, the following account: When she had looked up at the ceiling she saw an axe sticking into a beam, and she thought, "What a dreadful thing it would be if Hans and I should get married, and we should have a baby-boy, and he should grow up, and we should send him into the cellar to draw beer, and the axe should fall on his head and *kill* him—Boo-hoo-hoo!" The moral is don't cross bridges until you get to them. Many of them are only in cloudland; others are real, but your path will turn off suddenly and go in another direction. Be generous, and sociable, and altruistic, as well as cheerful, and these sentiments will react upon you and make you more cheerful. I have been accused of being proud and unsociable. It is not true! Say rather: "He is shy and absorbed, and the days are not long enough!" Be of a forgiving spirit. Most of my life has been spent delving into the printed history of things, isolating or inoculating parasites, looking into culture tubes

and flasks, or staring down the barrel of a microscope. It is a very laborious and exacting and at the same time a rather narrowing occupation, albeit a fascinating one. I have often said, jokingly, I would have gone into some other business if I had realized how much hard work I would have to do to get a *little* out of plant pathology.

Fourth: Cultivate the intellectual life. I believe that exercise of the intellect is an aid to longevity. How many philanthropists, statesmen, mathematicians, astronomers, physicists, chemists, geologists, physicians, and students of literature and the natural sciences have lived to be old. Their name is legion. Here are a few:

England: Sir W. Jenner (83), Soame Jenyns (83), Gladstone (89) John Bright (78), Wellington (83), Lister (85), Tennyson (83), Wordsworth (80), Frederick Harrison (92), Burdon-Sanderson (77), Berkeley (86), Bastian (78), James Montgomery (83), Sir Moses Montefiore (101), Isaac Disraeli (82), Benjamin Disraeli (77), Herbert Spencer (83), John Ruskin (81).

France: Voltaire (84), Buffon (81), E. Blanchard (80), Biot (88), Béchamp (92), Berthelot (80), Victor Hugo (83), Quatrefages (82), St. Simon (80), Chauveau (90), Dumas, the chemist (84), Delafosse (82), Desmazières (76), Boussingault (85), Van Tiegham (75), Ambrose Paré (81), Milne-Edwards (85).

Germany and Holland: Goethe (83), Von Recklinghausen (77), Ehrenberg (81), Leeuwenhoek (91).

Italy: Michael Angelo (89), Titian (99), Leo XIII (93), Galileo (78), Gentile Bellini (80), Giovanni Bellini (90).

United States: E. R. Hoar (79), Emerson (79), Davis (81), Alcott (89), Robert Collyer (89), S. Weir Mitchell (84), James D. Dana (82), W. J. Beal (91). You are all in the right class intellectually, if only you have a good inheritance behind you and will live simply and wisely, yet even with inherited handicaps some men have accomplished an enormous amount of work and lived beyond 70, e.g., Charles Darwin (73) and Louis Pasteur (73).

Fifth: Do not neglect the physical side. Breathe pure air, night and day; eat a good variety of plain foods and not too much. Don't worry about calories and vitamins. Do some physical work each day. Golf is for rich men; sawing wood, tending furnace, hoeing in the garden, housework, and botanizing are better exercises for such as we are. Botanizing is a more wholesome exercise than straight walking, because, like golf, it brings more muscles into action and at the same time keeps the mind interested. But straight walking is also good. How soon it dissipates a thousand gloomy fancies! Five or

ten miles a day ought to keep any scientific man in trim, unless he is a glutton, in which case there is no hope for him, here or hereafter, according to Dante. You remember how low down in his *Inferno* he puts them.

Sixth: Here are some of my own habits. My first acquaintance with Dr. Osler, then a great light in the medical firmament, was made just 30 years ago. I was sick, or thought I was, which sometimes amounts to the same thing, and Fairchild persuaded me to see Osler and went over to Baltimore with me. The great man looked at my tongue, felt of my pulse, listened to my heart, thumped and prodded me all over, and finally said, with a twinkle in his eye, "Doctor, you're all right *except here*," pointing to his head. Then he prescribed six months' vacation and 40 wet packs. Knowing how desperately hard he worked, I replied: "Why don't you take your own medicine, Doctor?" That was the beginning of our friendship which lasted as long as he lived, until 1920. I took six of his wet packs and swore off. The remedy seemed to me worse than the disease. As for six months' vacation on a salary $1600 (or was it $1800?), with half a dozen interesting pieces of work in progress, and Alfred Fischer to answer, that was wholly out of the question. Osler told me he worked like the devil nine months of the year but played the other three. I have not done that, but I have taken plenty of mental recreation, if not physical. I have learned it is not good to be jabbing forever on one set of brain cells. By spurts, a few months at a time, I have worked at certain subjects very hard, often 12 to 16 hours a day or more, i.e., all day and half the night, but always I have gone easily afterward for a while to recuperate, and one year with another, I have done a great deal of miscellaneous reading not directly related to my work—religious books (bibles, sermons, books of devotion, Christian, Stoic, Buddhist, Mohammedan); current literature; travels; histories; memoirs; autobiographies; letters; essays (Bacon, Montaigne, Carlyle, Emerson, and many others); poems (all sorts in half a dozen languages); plays (especially Shakespeare, but a little of Ibsen and Shaw,—yes, even Shaw—also Schiller, Hugo, Racine, and Molière—I have been very fond of Molière and of Synge, the Irish playwright); ghost stories; detective stories; novels and romances (Smollet, Fielding, Scott, Dickens, Thackeray, Hardy, Dumas, Hugo, Daudet, Cooper, Hawthorne, and many others); politics; logic; philosophy (Plato, Kant, Spinoza, Schopenhauer, Comte, Herbert Spencer, William James); Greek, Roman, and Indian mythology; Egyptology;

folk-lore; art criticism; general botany; entomology; archaeology; geology; astronomy; chemistry; medicine; and what not. All has been grist to my mill, with the exception of the higher mathematics, in which I have had no training. All knowledge has fascinated me. Like Browning's Grammarian, I would know all; even to the crumbs, I would eat up the feast. I read all of the 50-odd volumes of *Botanisches Centralblatt* one year. Beginning with the first article, I read all of the *Atlantic Monthly* for many years, not to mention a dozen other journals. And, it is safe to say, I have read one thing nobody else in this room has read, that is, the whole of the letter *C* in the *Century Dictionary*, only a matter of 800 pages. This I did to get their style of writing definitions before I began my work on Mycology for the first edition of the *Standard Dictionary*. I did it in four days and my head was in a whirl when I got through. I was never intoxicated with alcohol, but *this was a kind of intellectual drunk*, not to be commended.

The brain is a curious organ; no two subjects, I believe, bring into play quite the same set of brain cells, and by shifting interests the hard-worked cells of your specialty will have a chance to rest; otherwise, you will get neurasthenia, and especially if you worry. I have some reason to believe that the sub-division of labor in the brain is even greater than I have indicated, that is, that each language you learn involves a new set of cells and even that the past or future tense of a language does not exercise quite the same cells as the present tense. But enough of this.

Seventh: Finally, I am two persons in one, many persons in one, if I regard my ancestors. When I am sick I am a pessimist; when I am well, and that is generally, I am an optimist, and my optimism has grown upon me with advancing years until it is now perhaps a besetting sin, but I am pretty certain to die a pessimist, and that may compensate. Pessimism is due generally to bad digestion and to undue reflection on present miseries—a bad stomach is always an evil influence. Blessed is the man who can eat hard boiled eggs at midnight and sleep the sleep of the just. Yet the chances are he will not live out his span of life because some time he will presume *too much* upon his immunity. Optimism means good health, which should be the normal state of man, and still more it means altruism as opposed to egoism, and also, and especially, it means *a far-reaching outlook*, and faith in God and in the perfectibility of humanity. In an optimistic mood I wrote the following sonnet, with which I will close. It embodies the best of my philosophy of life. In it I have blended both my pessimism and my optimism, but optimism has the final word.

AT 70

Backward I look from summit of the years
At the rugged dusty way of toil and grime,
From level distant plain of boyhood's prime,
—Way strewn with hopes, with triumphs and with tears:
And I am optimist, like him who hears
Clear voices call from higher peaks of Time,
Across the cloudy glens, and turns to climb
What yet remains, with more of hopes than fears.
I'm but a grain of sand upon Time's shore,
Driven by wind and waters evermore!
And *millions* make but shifting dunes and bars!
Yet I can read in every grassy sod
Divine great thoughts that sweep beyond the stars
And make me one with Him who is our God!

BOTANY. *New species of plants from Salvador. IV.* PAUL C. STANDLEY, U. S. National Museum.[1]

Abutilon vulcanicola Standl., sp. nov.

Shrub, 1.5–5 m. high, copiously branched, the young branches densely stellate-tomentose with yellowish, fine and coarse hairs; stipules caducous; petioles 2.5–9 cm. long; leaf blades orbicular-cordate, 10–18 cm. long and wide, abruptly acuminate, deeply cordate at base, entire or sometimes shallowly trilobate near the apex, green above, sparsely and very minutely stellate-pubescent or glabrate, paler beneath, densely and minutely stellate-pubescent; pedicels axillary, solitary, mostly 10–12 cm. long, jointed near the apex; calyx tube broadly campanulate, 1.5 cm. long, densely fulvous-tomentose, the lobes oblong-triangular, acuminate or attenuate, equaling the tube, reflexed, stellate-tomentose outside, densely whitish-sericeous within; petals orange, 4.5–6 cm. long, broadly obovate, recurved, coarsely stellate-pubescent outside; stamen tube 2.5 cm. long, glabrous above, enlarged and stellate-hirsute at base, the stamens very numerous; styles stellate-pubescent; fruit about 3 cm. in diameter, the carpels very numerous, rounded at apex, stellate-hirsute.

Type in the U. S. National Herbarium, no. 1,137,315, collected on the Volcán de San Vincente, Salvador, altitude about 1500 meters, March, 1922, by Paul C. Standley (no. 21514). Also collected on the same volcano, but on the opposite side, in March, 1922, by Dr. Salvador Calderón (no. 344).

A showy and handsome plant, quite unlike any species of *Abutilon* previously reported from Central America. The vernacular name is *malva*.

Hibiscus longipes Standl., sp. nov.

Plants apparently herbaceous, the branches covered with a dense stellate pubescence consisting of coarse spreading yellowish hairs and of finer appressed white ones; stipules subulate, 4–6 mm. long; petioles slender, 2.5–5

[1] Published by permission of the Secretary of the Smithsonian Institution. The last preceding paper of this series was published in the present volume of the Journal, pp. 93–99.

cm. long, densely and coarsely stellate-pubescent; leaf blades broadly ovate to rounded-ovate, 6–10 cm. long, 4–6 cm. wide, acute or obtuse at apex, cordate to truncate at base, shallowly crenate-dentate, thin, stellate-pubescent and rough on both surfaces, or glabrate above, the pubescence consisting of coarse 3-rayed hairs and of numerous much smaller and finer ones; pedicels axillary, mostly 5–9 cm. long; bractlets 8 or 10, slightly or much shorter than the calyx, oblanceolate or linear-oblanceolate, 2.5–4 mm. wide, acute, stellate-pubescent; calyx 2–2.5 cm. long, finely or coarsely stellate-pubescent, the lobes longer than the tube, lance-triangular, attenuate; corolla purplish, about 4 cm. long, the petals sparsely stellate-pubescent outside; capsule about 1.5 cm. long, very minutely stellate-pubescent; seeds densely covered on all sides with long soft silky hairs.

Type in the U. S. National Herbarium, no. 1,152,605, collected in the garden at the Finca San Nicolás, Salvador, in 1923 by Félix Choussy (no. 5). The following additional specimens have been examined:

SALVADOR: San Salvador, *Calderón* 820.

HONDURAS: Río Chamelecón, Departamento de Santa Bárbara, *Thieme* 5152.

Related to *H. lavateroides* Moric. (as which the Honduran collection was distributed), but distinguished by the much larger flowers. *Hibiscus lavateroides* is known at present only from eastern Mexico.

Malache fonsecana Standl., sp. nov.

Shrub, 1–2 m. high, the branchlets densely viscid-pubescent; stipules linear-subulate, 2.5–3.5 mm. long; petioles 1–2 cm. long, viscid-pubescent; leaf blades triangular-ovate or oblong-ovate, 3–5 cm. long, 1.5–2.5 cm. wide, gradually narrowed toward the attenuate apex, cordate at base, irregularly and shallowly crenate, glandular-viscid on both surfaces, green above and densely stellate-pubescent, pale beneath and stellate-tomentose; pedicels mostly axillary and solitary, 3–4 cm. long or longer, slender, viscid-pilose, jointed near the apex; bractlets 8–10, linear, green, 10–14 mm. long, densely glandular-pubescent; calyx 6 mm. long, scarious but green-nerved, viscid-setulose, the lobes ovate, acute, about equaling the tube; corolla densely pubescent outside; fruit 6 mm. in diameter, glabrous, dry, the carpels rounded at the apex, unarmed, obscurely nerved.

Type in the U. S. National Herbarium, no. 1,136,506, collected in dry thicket near La Unión, Salvador, on the Gulf of Fonseca, February, 1922, by Paul C. Standley (no. 20677).

Ayenia micrantha Standl., sp. nov.

Young branches slender, densely and minutely brownish-tomentose; petioles stout, 8 mm. long or less, nearly obsolete in the upper leaves, minutely tomentose; leaf blades ovate, 3–7 cm. long, 2–4 cm. wide, acute or acuminate, rounded or subcordate at base, coarsely crenate-serrate, above green and furnished with very minute scattered stellate hairs, beneath paler, finely and rather densely stellate-pubescent, 5 or 7-nerved at base; flowers in axillary fasciculate umbels, the peduncles 2–3 mm. long (sometimes up to 14 mm. in fruit), the pedicels 2–3 mm. long or in fruit often 8 mm. long; calyx minutely stellate-pubescent outside, the lobes ovate, 2 mm. long, acuminate, brown-purple and glabrous within; fruit (including spines) 6 mm. in diameter, sessile or nearly so, the spines very numerous and crowded, stout, scaberulous or glabrate.

Type in the U. S. National Herbarium, no. 1,151,926, collected near Chalchuapa, Salvador, in 1922 by Dr. Salvador Chalderón (no. 961).

Related to *A. jaliscana* S. Wats., a Mexican species, which is distinguished by its larger flowers, copious and longer pubescence, and the few short tubercles of the fruit.

Parsonsia salvadorensis Standl., sp. nov.

Plants erect, suffrutescent, 30–60 cm. high, sparsely branched, the stems densely covered with short stiff spreading hairs; petioles 3–9 mm. long, pubescent like the stems; leaf blades ovate-oblong or ovate, 2.5–5 cm. long, 1–2 cm. wide, acute or acutish, acute at base, thick, green on the upper surface and densely scabrous, somewhat paler beneath, scabro-hirtellous, especially along the nerves; flowers alternate, solitary in the leaf axils, short-pedunculate, the pedicel 5–6 mm. long, hirtellous, bearing at the middle 2 minute green bractlets; calyx stout, 28 mm. long, 5 mm. in diameter, bright red, densely and minutely hirtellous, the hairs somewhat thickened toward the base, the spur very short and broadly rounded, the tube glabrous within, not crested; calyx lobes all alike or nearly so, scarcely 2 mm. long, broadly ovate, acutish, ciliate, the cilia thickened at base, the appendages rounded-ovate, longer than the calyx lobes, greenish, ciliate with bulbous-based hairs; stamens 11, inserted about 23 mm. above the base of the tube; disk consisting of a short thick rounded dorsal projection; petals 2, bright red, clawed, the blades about 3 mm. long; capsule broadly oblong, glabrous, compressed, 7 mm. long, obtuse; seeds about 19, 2 mm. in diameter.

Type in the U. S. National Herbarium, no. 1,136,046, collected on edge of forest, near Finca Colima, Sierra de Apaneca, Departamento de Ahuachapán, Salvador, January, 1922, by Paul C. Standley (no. 20190).

Eugenia alfaroana Standl., sp. nov.

Shrub, 1–5 m. high, very densely branched, the branchlets very slender, thinly pilose-sericeous; petioles 2–4 mm. long, appressed-pilose; leaf blades linear or nearly so, often slightly broadened near the base, 5–6 cm. long, 1.5–4 mm. wide, acute at base, acute at apex and aristate-mucronate (bristle 1.5 mm. long), thin, when young thinly pilose-sericeous with whitish hairs, soon glabrate, paler beneath, finely glandular-punctate, the margins thickened and often revolute; pedicels axillary, solitary, 1.5–2 cm. long, very slender, appressed-pilosulous or glabrate; bractlets 2 at the base of the calyx, filiform-subulate, 2–3 mm. long; calyx tube 2 mm. long, densely white-tomentose, the lobes ovate, subulate-acuminate, 2.5–3 mm. long, tomentose or glabrate; petals broad, white, 3 mm. long, ciliolate, copiously gland-dotted; fruit purple-black, 6–7 mm. in diameter, glabrate; seed 1, about 6 mm. in diameter.

Type in the U. S. National Herbarium, no. 1,135,917, collected in open place at edge of forest on the lower slopes of the Sierra de Apaneca, Finca Colima, Departamento de Ahuachapán, January, 1922, by Paul C. Standley (no. 20053). The following additional collections are referable here:

SALVADOR: Departamento de Ahuachapán, *Padilla* 211, 330. Sonsonate, planted in a finca, *Standley* 22310.

Eugenia alfaroana is named in honor of Don Carlos Alfaro, in whose company the type specimen was collected, and to whom I am indebted for several days pleasantly and profitably spent at the Finca Colima, one of the most beautiful regions of Salvador and one of the most interesting botanically.

The plant is a relative of *Eugenia linearis* Rich. and *E. pomifera* (Aubl.) Urban. It is a handsome plant and is frequently cultivated in western Salvador. At Finca Colima the vernacular name was given as *pinito cimarrón* and at Sonsonate as *pino real*. Dr. Padilla reports the names as *ciprés* and *pino*.

Psidium rensonianum Standl., sp. nov.

Branches grayish, thickened and somewhat compressed at the nodes, when young very closely sericeous, soon glabrate; petioles stout, 5–8 mm. long; leaf blades elliptic to oblong or obovate, 5–10.5 cm. long, 2.5–5.5 cm. wide, obtuse or rounded at apex, acute at base, thick, green above and glabrous, the venation inconspicuous, beneath pale, very closely and finely sericeous (pubescence perceptible only under a strong lens) or in age glabrate, finely punctate, the costa prominent, the lateral nerves about 9 pairs, slender and inconspicuous, remote, laxly anastomosing near the margin; inflorescences axillary, 3–5-flowered, short-pedunculate, finely sericeous or glabrate, the pedicels stout, 3–6 mm. long; ovary minutely sericeous, the calyx densely brownish-sericeous, splitting into 5 irregular rounded lobes about 3 mm. long, these persistent upon the fruit; fruit glabrate, subglobose, 10–12 mm. in diameter, 1-seeded.

Type in the U. S. National Herbarium, no. 1,151,795, collected at San Salvador, Salvador, July, 1922, by Dr. Salvador Calderón (no. 838). *Renson* 339 from Salvador represents the same species.

Psidium rensonianum is probably related to *P. sartorianum* (Berg) Niedenzu, which, also, occurs in Salvador, but that species differs in its small leaves and lack of pubescence. The vernacular name of *P. rensonianum* is is given as *guacoco*.

Jacquinia longifolia Standl., sp. nov.

Shrub or small tree, 2–5 m. high, the branches slender, glabrous; leaves mostly alternate, but the uppermost often pseudo-verticillate, the petioles 3–5 mm. long, compressed, glabrous or minutely hirtellous, the blades narrowly oblanceolate-oblong, 5–7 cm. long, 8–17 mm. wide, obtuse or rounded at apex, not mucronate, gradually narrowed to the base, comparatively thin, green on both surfaces, glabrous or sometimes minutely hirtellous above along the costa, 3-nerved, the secondary nerves inconspicuous and laxly reticulate; pedicels solitary or fasciculate in the leaf axils, slender, thickened at apex, 4–5 mm. long (in fruit up to 8 mm.), glabrous; calyx 3 mm. long, glabrous, the lobes orbicular, obscurely crenulate and obsoletely ciliolate; corolla yellow, 7 mm. broad, the tube campanulate, 3 mm. long, the lobes suborbicular, two-thirds as long as the tube; staminodia rounded-oval, half as long as the corolla lobes; anthers cordiform, shorter than the appendages, obtuse, not emarginate, the filaments narrowly triangular; fruit ellipsoid, 1–1.5 cm. long, smooth, mucronate at apex, few-seeded.

Type in the U. S. National Herbarium, no. 1,136,970, collected in thicket on rocky stream bank at San Vincente, Salvador, March, 1922, by Paul C. Standley (no. 21159). *Standley* 21743, from the same locality, is also referable to this species.

Jacquinia longifolia belongs to the small group of species whose leaves are not pungent-mucronate at apex. It is not closely related to any of those previously described, all of which are natives of South America and the West Indies.

Ipomoea calderoni Standl., sp. nov.

A herbaceous vine, the stems slender, glabrous, bearing a few scattered compressed winglike tubercles; petioles slender, 11–14 cm. long, glabrous; leaf blades ovate-cordate to rounded-cordate, 11–15 cm. long, 7.5–11 cm. wide, acute and cuspidate-acuminate, with an acumen about 3 cm. long, deeply cordate at base, the sinus open, thin, glabrous throughout; peduncles axillary, solitary, recurved, 2–4-flowered, glabrous or bearing a few fleshy spinelike tubercles, the pedicels in anthesis about 2 cm. long, in fruit up to 5.5 cm. and much thickened (5–6 mm. thick beneath the calyx); sepals about 12 mm. long, ovate, coriaceous, glabrous, with thin scarious margins, cuspidate-acuminate at apex, the cusp greenish; corolla purple, slender funnel-form, the tube about 5 cm. long and nearly 2 mm. in diameter, the throat 2.5 cm. long, the limb about 3 cm. long, angulate; capsule 4-celled, oblong-ovoid, about 2.5 cm. long; seeds 4, glabrous, brown, 12 mm. long.

Type in the U. S. National Herbarium, no. 1,151,843, collected at San Salvador, Salvador, in 1922 by Dr. Salvador Calderón (no. 883).

Operculina hirsuta Standl., sp. nov.

A herbaceous vine, the stems scandent, sparsely long-hirsute; petioles slender, 6–9 cm. long, sparsely long-hirsute or glabrous; leaf blades rounded-cordate or broadly deltoid-cordate, 9–13 cm. long, 7.5–11 cm. wide, acute or acuminate, usually somewhat abruptly so, shallowly cordate at base, with a broad open sinus, the basal lobes broadly rounded, thin, glabrous; pedicels axillary, solitary 1-flowered, 3.5–4.5 cm. long, thick and stout (5 mm. in diameter below the calyx), glabrous, reflexed in fruit; sepals 2.5–3 cm. long, oblong-ovate, obtuse or rounded at apex, glabrous, green but with thin scarious margins; corolla pink, funnel form, 10 cm. long, the tube just above the calyx 10–12 mm. in diameter; capsule 2.5 cm. long, glabrous, 3-seeded; seeds strongly compressed, 12 mm. long, densely appressed-pilose, the margins thickly fringed with white silky hairs 1 cm. long or more.

Type in the U. S. National Herbarium, no. 1,152,316, collected in garden at San Salvador, Salvador, in 1922 by Dr. Salvador Calderón (no. 1338).

Easily recognized among the related species by the hirsute pubescence of the stems.

Cordia salvadorensis Standl., sp. nov.

Young branchlets sparsely hirtellous with spreading or partly appressed hairs; petioles slender, 1.5–3.5 cm. long, glabrate; leaf blades elliptic or oblong-elliptic, mostly 15–20 cm. long and 8–9.5 cm. wide, abruptly acute or acuminate, obtuse or acute at base, thin, deep green, remotely and shallowly sinuate-serrate above the middle or occasionally subentire, sparsely scaberulous on the upper surface, beneath scaberulous and along the nerves short-pilose, densely barbate in the axils of the nerves; flowers in lax, terminal or pseudo-axillary cymes, these few- or many-flowered, about 5 cm. long or in fruit as much as 15 cm. long, the branches scaberulous and hirtellous; flowers sessile or nearly so; calyx nearly 4 mm. long, scaberulous, finely multistriate, the 5 teeth very short, broadly triangular, obtuse; corolla tube varying from shorter than the calyx to slightly exceeding it, the lobes oblong, obtuse, glabrous, half as long as the calyx; fruit subglobose, 6 mm. long.

Type in the U. S. National Herbarium, no. 1,152,097, collected at San Salvador, Salvador, August, 1922, by Dr. Salvador Calderón (no. 1126).

Citharexylum macrocarpum Standl., sp. nov.

Tree of medium size, with rounded crown, the branches grayish, the young branchlets minutely whitish-puberulent; leaves opposite, the petioles 6–18 mm. long, puberulent, the blades elliptic, obovate-elliptic, or rhombic-obovate, 5–7.5 cm. long, 2.5–4.5 cm. wide, rounded, obtuse, or abruptly acute at apex, cuncately acute at base, green above, glabrous or puberulent along the costa, beneath paler, hirtellous, especially along the nerves, or soon glabrate, the blades rather definitely triplinerved, the secondary nerves prominulous and reticulate; flowers in slender few-flowered axillary spikes 1.5–2 cm. long, the rachis minutely puberulent; calyx in fruit 4 mm. long, glabrous, 5-costate, very shallowly 5-dentate, the teeth broad, obscurely mucronate; fruit apparently dry, 13–17 mm. long, 6 mm. broad, glabrous, somewhat compressed, oblong, soon splitting into 2 strongly compressed stones, each of these 2-called and 2-seeded.

Type in the U. S. National Herbarium, no. 1,152,213, collected at La Cebadilla, Departamento de San Salvador, Salvador, in 1922 by Dr. Salvador Calderón (no. 1234). Here is to be referred also *Tonduz* 13792, collected in forests of the hills of Nicoya, Costa Rica, in December, 1899.

Although here referred to the genus *Citharexylum*, it is almost certain that this tree will be found to represent the type of a new genus. Unfortunately the flowers are lacking, and until they have been collected its status must remain doubtful. The fruit characters agree better with those of *Citharexylum* than those of any other genus of the Verbenaceae, but the fruit appears to be dry, and if such is the case, the tree will have to be placed elsewhere. It is probable that the flowers will be found to afford important diagnostic characters.

Physalis hylophila Standl., sp. nov.

Herb, 30–90 cm. high, much branched, the stems copiously viscid-villous with white hairs; petioles slender, 6–18 mm. long, viscid-villous; leaf blades ovate or ovate-elliptic, 2–4 cm. long, 1–2.5 cm. wide, abruptly acuminate, obliquely rounded at base, thin, entire, sparsely viscid-villous on the upper surface with short whitish hairs, beneath more densely villous with longer, mostly gland-tipped hairs; pedicels 3–5 mm. long, recurved in fruit, slender; calyx 3–4.5 mm. long, densely villous with short viscid hairs, the teeth short, broadly ovate, obtuse or acutish; corolla 6–7 mm. long, pale greenish yellow, the lobes ciliolate; fruiting calyx about 15 mm. long and 12 mm. in diameter, rather sparsely glandular-pubescent, obtusely 5-angulate, depressed at base, reticulate-veined, the teeth about 2 mm. long.

Type in the U. S. National Herbarium, no. 1,136,789, collected on a wooded slope along the shore of the Laguna de Maquigüe, Departamento de La Unión, Salvador, altitude about 60 meters, February 18, 1922, by Paul C. Standley (no. 20971).

The Central American species of *Physalis* have not been studied critically in recent years, but the present plant does not appear to be referable to any of the species described from that region or from Mexico. The vernacular name is *bombita*.

Tabebuia calderoni Standl., sp. nov.

A large shrub with thick trunk, the branchlets glabrate; petioles slender, terete, glabrous, 3–5 cm. long; leaflets 3, the petiolule of the terminal one about 2 cm. long, those of the lateral leaflets shorter, the blades oblong or ovate-oblong, 9–12 cm. long, 3–5.5 cm. wide, shortly obtuse-acuminate, obtuse or rounded at base, thick, lustrous above, glabrous, the venation elevated, beneath brownish (when dry), glabrous; flowers in terminal paniculate racemes, these about 10 cm. long, many-flowered, the rachis densely and minutely puberulent, the pedicels stout, 3–4 mm. long; bracts large and conspicuous but caducous; calyx campanulate, 5–6 mm. long, very shallowly 3-lobate, densely and very minutely puberulent; corolla yellow, about 4.5 cm. long, the limb 4 cm. broad, glabrous within, minutely lepidote outside, the lobes rounded-obovate.

Type in the U. S. National Herbarium, no. 1,165,688, collected at Acajutla, Salvador, July 13, 1923, by Dr. Salvador Calderón (no. 1666).

A very distinct species because of its combination of trifoliolate leaves and yellow flowers.

Aphelandra padillana Standl., sp. nov.

Shrub, 1–2.5 m. high, sparsely branched, the stems pruinose-puberulent and when young sparsely strigillose; leaves petiolate, the blades oblong-lanceolate or oblong-ovate, 15–25 cm. long, 4–9 cm. wide, acuminate, abruptly acuminate to the base and long-decurrent upon the petiole, thin, bright green above, bearing a few scattered short hairs, beneath paler, pruinose-puberulent; spikes stout, terminal and axillary, 12–30 cm. long, very dense, the rachis densely glandular-pilose; bracts closely imbricate, ovate or broadly ovate, 2–3 cm. long, obtuse or rounded at apex or the uppermost acutish, entire, green or purplish, densely glandular-pilose with short whitish hairs; flowers sessile, the bractlets linear-subulate, equaling the calyx, glandular-pilose; calyx lobes linear-lanceolate, 1.5 cm. long, long-attenuate, finely striate-nerved, finely glandular-pilose; corolla bright red, 6.5–7.5 cm. long, finely glandular-pilose outside, the tube nearly 5 cm. long, 7 mm. wide in the throat, the upper lip obovate, nearly 3 cm. long, obtuse or rounded at apex, the lower lip 3-parted, the segments lance-oblong, acute or obtuse; stamens exserted, the filaments glabrous or sparsely pilose, the anthers 4 mm. long; capsule 2 cm. long, elliptic-oblong, acutish, densely and finely pubescent.

Type in the U. S. National Herbarium, no. 1,135,839, collected along a stream in the mountains near Ahuachapán, Salvador, altitude about 1000 meters, January, 1922, by Paul C. Standley (no. 19972). The following additional specimens belong here:

SALVADOR: Ahuachapán, *Standley* 19771. Volcán de San Vincente, alt. 1500 meters, *Standley* 21512. Comasagua, *Calderón* 1364. Finca Chilata, Departamento de Sonsonate, *Standley* 19315. San Vicente, alt. 350 meters, *Standley* 21680. Santa Tecla, *Calderón* 1422.

Aphelandra padillana is named for Dr. Sisto Alberto Padilla of Ahuachapán, a keen student of the Salvadorean flora, to whom the writer is indebted for many favors during his visit to western Salvador in January, 1922. Dr. Padilla has published various articles upon the natural history of Salvador and other parts of Central America, and has forwarded to the National Museum a large collection of plants made by himself in the Department of Ahuachapán.

The species here described is a very showy plant that is common in the mountains of Salvador, but I have seen no specimens from other parts of Central America. It is a form well worthy of cultivation because of its handsome red flowers and attractive leaves. The only vernacular name obtained for it is *hierba de cadejo*, which was given me at Ahuachapán.

Justicia soliana Standl., sp. nov.

Slender shrub or herb, 1–2 m. high, much branched, the stems somewhat puberulent when young but soon glabrate; leaves slender-petiolate, the blades oblong-lanceolate to ovate, mostly 9–18 cm. long and 3–9 cm. wide, long-acuminate, abruptly acuminate at base and long-decurrent upon the petiole, thin, deep green above, glabrous, beneath paler, somewhat puberulent along the nerves but elsewhere glabrous, furnished on both surfaces with very numerous short raphids; inflorescence of numerous small thyrsiform panicles, these terminal and in the upper leaf axils, forming an elongate thyrsiform leafy-bracted panicle 10–30 cm. long, its rachis finely puberulent; bracts linear or linear-oblanceolate, 12–25 mm. long, green, obtuse or acute, minutely puberulent and near the apex usually, finely glandular-pilose, the bractlets similar but shorter and narrower; flowers sessile or nearly so; calyx segments linear-attenuate, subequal, 4–5 mm. long, finely puberulent; corolla bright red, 2.5–3 cm. long, densely short-pilose outside and with numerous short gland-tipped hairs, the tube straight, much longer than the lips, 4 mm. broad in the throat, contracted above the ovary, the lips subequal, suberect, the posterior one obscurely bidentate, the anterior one very shallowly 3-dentate; anthers unequally inserted, mucronate at base; capsule about 18 mm. long, clavate, glabrous; seeds 4, compressed, suborbicular, 3 mm. in diameter, muricate.

Type in the U. S. National Herbarium, no. 1,135,238, collected on a rocky stream bank at Finca Chilata, Departamento de Sonsonate, Salvador, December 26, 1922, by Paul C. Standley (no. 19325). The following additional specimens have been examined:

SALVADOR: Ahuachapán, alt. 1000 m., *Standley* 20009, 19777. Departamento de Ahuachapán, *Padilla* 13. Comasagua, *Calderón* 1408. San Miguel, alt. 110 m., *Standley* 21149. Finca Chilata, *Standley* 19313. Finca Colima, Sierra de Apaneca, Departamento de Ahuachapán, *Standley* 20056.

Justicia soliana is a handsome plant, very common in the mountain regions of Salvador, but I have seen no specimens from other parts of Central America. It is named for Sr. Don Salvador Sol, Minister of Salvador in the United States, to whom I am indebted for a pleasant visit to Finca Chilata, where the type specimen was collected.

Bouvardia pallida Standl., sp. nov.

Slender shrub, 1–1.5 m. high, the branches grayish, the young branchlets minutely puberulent; stipule sheath 2–3 mm. long, minutely puberulent, the free portion triangular, subulate-acuminate, glandular-laciniate; leaves mostly ternate, the petioles 2–3 mm. long, the blades lanceolate to narrowly ovate, 2.5–4.5 cm. long, 1–2.3 cm. wide, long-acuminate, acute or obtuse at base, thin, sparsely scaberulous or glabrate above, beneath paler, puberulent along the nerves; inflorescences terminal, cymose-corymbose, 5–12 cm. broad, many-flowered, dense, the bracts mostly large and leaflike, the pedicels slender, 2–4 mm. long, puberulent; hypanthium hemispheric, puberulent, the

calyx lobes oblong-linear, 2–3 mm. long; corolla lavender, glabrous, the tube stout, 5 mm. long, broadened upward, the lobes ovate-oblong, 3 mm. long, obtuse, glabrous within; filaments exserted; capsule subglobose, 3 mm. broad; seeds broadly winged.

Type in the U. S. National Herbarium, no. 1, 138,686, collected in a dry thicket on the lower slopes of the Volcán de San Salvador, above Santa Tecla, Salvador, April 7, 1922, by Paul C. Standley (no. 22977).

Related to *B. bouvardioides* (Seem.) Standl., a Mexican species, in which the corolla is twice as large and red.

Stylosiphonia salvadorensis Standl., sp. nov.

Slender shrub, 2.5–3.5 m. high, the branches terete, brownish, the young branchlets glabrous or sparsely pilose; stipules interpetiolar, 1.5–2 mm. long, deltoid, subulate-acuminate, persistent; leaves opposite, the petioles slender, 2–4 mm. long, sparsely pilose or glabrous, the blades lance-oblong, 3.5–6.5 cm. long, 1–2 cm. wide, rather abruptly acuminate, acute to attentuate at base, thin, bright green above, very sparsely pilose or glabrous, beneath paler, when young thinly floccose-tomentose, in age sparsely pilose, ciliate; flowers in few-flowered axillary cymes, the branches glabrous or nearly so, the peduncles about 5 mm. long, the pedicels slender, 5–8 mm. long, recurved in fruit; bracts linear, about 3 mm. long; calyx lobes linear-subulate, 2.5–3 mm. long; capsule ovoid, 5–6 mm. long, glabrous, costate, loculicidally dehiscent to the middle of the valves, the septum also cleft in dehiscence; seeds minute, brown angulate.

Type in the U. S. National Herbarium, no. 1,137,349, collected in moist forest on the Volcán de San Vicente, Salvador, altitude 1500 meters, March 8, 1922, by Paul C. Standley (no. 21559).

The flowers are not known, and the generic position of the plant is consequently doubtful, but it seems to agree better in fruiting characters with *Stylosiphonia* than with any other known genus of the Rubiaceae.

Verbesina salvadorensis Blake, sp. nov.

Stem obscurely pubescent; leaves alternate, obovate, acuminate, long-cuneate at base, very short-petioled, about 20 cm. long, 5 cm. wide, serrulate, strigillose but smooth to the touch above, sparsely pilosulous beneath chiefly along the nerves; heads medium-sized, radiate, white, in terminal flattish cymose panicles.

Herbaceous, at least above, probable tall and simple below the inflorescence; stem stout, subangulate, wingless, purplish-brown, sparsely short-pilose with chiefly appressed or ascending hairs, glabrescent except toward apex; leaves (only the upper seen) alternate, 1 to 3 cm. apart; petioles broad, naked, strigose, not auriculate or decurrent, 3 mm. long; blades obovate or oblong-obovate, 12.5 to 20 cm. long, 3 to 5 cm. wide, acuminate, gradually or somewhat abruptly narrowed into a long cuneate base, serrulate with low blunt teeth above the entire cuneate lower portion, papery, above deep green, finely lepidote-strigillose (the lepidote hair-bases persistent), beneath somewhat yellowish green, sparsely pilosulous on the veins and veinlets and sometimes slightly so on the surface, feather-veined, the costa whitish and prominent beneath, the chief lateral veins (above the narrowed basal part of the blade) about 10 pairs, whitish, prominulous beneath, the veinlets obscure; panicle flattish, pilose with appressed or loose hairs, about 22 cm. wide, equaled by the

upper leaves, composed of about 6 partial panicles terminating the stem and branches, these 5 to 10 cm. wide, many-headed; bracts linear or spatulate, mostly 2 cm. long or less; pedicels 2 to 10 mm. long; heads about 12 mm. wide; disk campanulate, 8 to 10 mm. high, 4 to 5 mm. thick; involucre about 3-seriate, graduate, 5 to 6 mm. high, the outermost phyllaries small, linear-lanceolate, with very short dark acutish tips, the others oblong or oblong-obovate, stramineous, acute or apiculate, ciliate, carinate and nearly glabrous dorsally, with subscarious appressed tips; rays 5, pistillate, white, the tube pilose, 2 mm. long, the lamina elliptic or oval, 2 or 3-toothed, 6 to 9-nerved, sparsely pilose dorsally, 4.5 mm. long, 2.2 mm. wide; disk corollas about 23, white, erect-pilose at base of throat, otherwise glabrous, 4.5 mm. long (tube 1 mm., throat funnelform, 3 mm., teeth ovate, 0.5 mm. long); pales narrow, acute or apiculate, ciliate above, 7 mm. long; achenes (immature) narrowly cuneate-obovate, about 4 mm. long, 1.5 mm. wide, very narrowly 1 or 2-winged, the wings ciliolate, decurrent on the base of the awns; awns 2, somewhat, unequal, 2 to 2.8 mm. long.

Type in the U. S. National Herbarium, no. 1,152,183, collected at La Cebadilla, Department of San Salvador, Salvador, in 1922, by Dr. Salvador Calderón (no. 1206).

A species of the Section *Ochractinia*, nearest the Guatemalan *V. punctata* Rob. & Greenm., which has the stems winged above with herbaceous wings up to 3 mm. wide.

ENTOMOLOGY.—*The North American bird parasites of the genus* Protocalliphora *(Calliphoridae, Diptera).*[1] RAYMOND C. SHANNON and IRENE D. DOBROSCKY. (Communicated by S. A. ROHWER.)

This paper deals primarily with the systematic treatment of the North American species of *Protocalliphora*, a genus of flies which, in the larval stage, parasitizes nestling birds. Swallows, crows, sparrows, larks, robins, and allied passerine birds are the usual hosts of these blood-feeding larvae, but the host record of an owl is also included below. Many nestlings are killed annually by these parasites. An extended biological account of the group will be given in a subsequent paper by the junior author.

Our native species have always been confused with the European forms. They may, however, be immediately separated therefrom by the absence of hairs on the post alar declivity and on the tympanic membrane (located between the inner margin of the lower squama and lower squama of post alar declivity).

Two names have been applied to American material: *Protocalliphora (Calliphora) splendida* Macquart, described 1845, has rarely

[1] We desire to express our appreciation to Drs. J. M. Aldrich, O. A. Johannsen and J. Bequaert for suggestions and material. For bibliography see Bezzi, Parasitology 14: 29–46. 1922.

been referred to in literature; the other, *P.* (*Phormia*) *metallica* Townsend, is apparently synonymous with *splendida*. Three North American species, besides several subspecies and varieties, are here recognized. A rather remarkable condition of sexual dichromatism is presented by this genus. *Protocalliphora sordida* of Europe is dark metallic blue in the male while the female is entirely of a bronzy cast. The species here called *splendida* Macq. seems to have several types of coloration in the female. One phase of the coloration is nearly as dark metallic blue as the male (probably the normal coloration); in another the tip of the abdomen is of a shining brassy hue (presumably a variation from the typical color, but this is the characteristic point in both Macquart's and Townsend's descriptions of their material—females in both cases); and a third phase is entirely bronzy, dull on the thorax and shining on the abdomen. The color of the squamae is also variable, being white in the majority of specimens, a deep and somewhat golden yellow in others, especially in the bronzy forms, and quite dark in certain specimens (both sexes) which occur in the West.

The dark form with tip of abdomen shining bronze (brassy) is apparently widely distributed throughout the United States. Representatives are at hand from New Hampshire, Virginia, Illinois, Wisconsin, Idaho, Washington, Oregon, and New Mexico. No doubt it also extends into Texas. It is fairly safe, therefore, to assume that Macquart's *splendida* (described from Texas) is conspecific with this form. Townsend's name *metallica* should then be considered as synonymous with *splendida*.

Probably more subspecies and varieties and even species exist in the *splendida* group but the external and genitalic differences have so little that is tangible it is deemed best not to recognize more than are here included. Perhaps additional rearings will give some clue to the differentiation of the forms. We do not yet know how specific the forms are for particular species of birds. In making observations on the habits of these parasites one particular point should always be noted, i.e., whether the larvae are living as endoparasites or whether they live externally and obtain blood by inserting only the mouth parts in the flesh. It is thought the species may behave differently in regard to this habit.

In the key to the genera of Calliphoridae[2] *Protocalliphora* and *Phormia* are separated from *Protophormia* and *Boreëlus* on the basis of possessing white squamae. Since specimens of *Protocalliphora*

[2] Ins. Ins Mens. **9**: 107. 1923.

occur with dark squamae the character "disc of upper squama bare" may be used for *Protocalliphora* and *Phormia* and "disc of upper squama thinly pilose" may be used for *Protophormia* and *Boreëlus*.

KEY TO MALES

A. Narrowest width of front equal to length of third antennal joint; outer forceps subquadrate, less than twice as long as broad. *avium* (sens. lat.) n. sp.
a. Hairs on mesonotum one-fourth length of bristles; basicosta black. (New York) ..... *avium avium*
aa. Hairs of mesonotum nearly half as long as bristles; basicosta orange. (Washington) ..... *avium asiovora n. var.*
AA. Narrowest width of front distinctly less than length of third antennal joint; outer forceps elongate, three to four times as long as broad.
B. Parafrontals contiguous (may not hold for varieties *parva* and *cuprea;* our male of *parva* is without head, male of *cuprea* unknown). *hirudo* (sens. lat.) n. sp.
b. Accessory notopleural present (Colorado) ..... *hirudo hirudo*
bb. Accessory notopleural absent (Kansas) ... *hirudo parva. n. var.*
BB. Parafrontals well separated ..... *splendida* (sens. lat.) Macquart.
c. Dark metallic blue; pollinose stripes but little evident on mesonotal disc.
d. Squamae white (U. S. generally) ..... *splendida splendida* Macq.
dd. Squamae darkened (Washington, Brit. Columbia). *splendida hesperia* n. var.
cc. Body with a general grayish tinge; pollinose stripes evident on disc of mesonotum (Washington) ..... *splendida hirunda* n. subsp.

KEY TO FEMALES

A. Large species (11 mm.); parafacials broad, opposite second antennal joint equal in width to distance between oral vibrissae; basicosta dark brown ..... *avium* (sens. lat.) n. sp.
a. Abdomen slightly pruinose (New York) ..... *avium avium* n. var.
aa. Abdomen with ashy tinge (Washington) ..... *avium asiovora* n. var.
AA. Smaller (9 mm. or less); parafacials usually narrower, opposite second antennal joint equal to one-half distance between oral vibrissae; if as broad as in *avium* then basicosta is orange.
B. Front unusually narrow; upper frontorbital absent; accessory notopleural present ..... *hirudo* (sens. lat) n. sp.
b. General color dark, with rather heavy pruinosity.
c. Squamae darkened (Colorado) ..... *hirudo hirudo*
cc. Squamae white (Kansas) ..... *hirudo parva* n. var.
bb. General color bronze (Washington) ..... *hirudo cuprea* n. var.
BB. Front normal; upper frontorbital present; no accessory notopleural. *splendida* Macquart.
c. Abdomen entirely dark blue.
d. Squamae white (Washington) ..... *splendida hirunda* n. subsp.
and (general U. S. distribution) ..... *splendida sialia* n. var.
dd. Squamae darkened ..... *splendida hesperia* n. var.
cc. Abdomen more or less coppery.

d. Entire body coppery (New Hampshire, Ontario) *splendida aenea* n. var.

dd. Last abdominal segment only coppery (general U. S. distribution..... *splendida splendida* Macq.

Protocalliphora avium, n. sp.

Male: Large, robust, dark steely blue, with faint pollinose longitudinal vittae on mesonotum. Head broader than high, very broadly triangular in frontal aspect. Front rather broad, at narrowest width fully equal to length of third antennal joint; frontal vitta opaque black; parafacials shining silvery pollinose and bearing, besides the frontal bristles, black hairs which continue up to the vertical bristles. Upper parafacial shining silvery pollinose, opposite second antennal joint broader than distance between oral vibrissae. Antennae dark brown, third joint darker; arista about length of antenna. Mesonotum under proper reflection with two broad longitudinal pollinose stripes, confluent anteriorly; a somewhat similar stripe present on humeri and extending backwards. Legs black. Abdomen dark blue with greenish and violet reflections. Forceps shining black, outer ones subquadrate, less than twice as long as broad; inner forceps stout, diverging apically. Wings smoky, darker basally; squamae white. Length: 11 mm.; wing 9.5 mm.

Female: Front noticeably broader than length of arista; parafrontals and upper parafacials shining pollinose with a somewhat bronzy reflection. Mesonotum and abdomen more extensively pollinose than in male. Length 11 mm., wing 9 mm.

Three males and five females. Ithaca, N. Y. Reared from nestling crows, (Cornell University Lot 1033, 108 and 108 Aa, I. D. Dobroscky). Two females Ithaca, N. Y., July 10, 1914 (probably some of Coutant's material) are provisionally placed here.

Type.—Cat. no. 26857 U. S. N. M. Paratypes in Cornell Collection.

This species may be recognized in the male by the characteristic forceps, the outer ones being much broader than in all other species of the genus. The broad front of both ♂ and ♀ likewise serve to identify this species. Otherwise it is very hard to distinguish the female from certain varieties of *splendida*.

Protocalliphora avium var. **asiovora,** n. var.

Male: Differs chiefly in its darker coloration, lighter colored basicosta, longer mesonotal hairs and the outer forceps being less truncated apically.

One male, reared from larva found in a long eared owl's nest (*Asio wilsonianus*) McElroy Lake, Paha, Washington, June 30, 1920 (R. C. Shannon). A female specimen collected at Almota, Washington (A. L. Melander) is provisionally placed here. It scarcely differs from females of *avium avium*. The abdomen is more pruinose.

Type.—Cat. no. 26858, U. S. N. M.

Protocalliphora splendida splendida Macquart.

Male: Shining dark blue. Head somewhat broader than high; front narrowed, being noticeably less, at narrowest point than length of third antennal joint; frontal vitta opaque black; parafacials and parafrontals shining silvery pollinose; parafrontals squeezed out above, thus causing a cessation

of the setae a noticeable distance below ocelli; parafrontals opposite second antennal joint as broad as distance between oral vibrissae. Mesonotum and scutellum without very evident pollinosity. Legs black. Abdomen with only faint trace of pruinescence. Outer forceps elongate (1×5) slightly tapering downwards, apex obtusely rounded. Inner forceps slender, normally paralleled. Wings darkened basally, basicosta shining brown; squamae white. Length: 10 mm.; wing, 8 mm.

Female: (variety *splendida*). Front of medium breadth, about twice as long as broad and with full complement of bristles; frontal vitta opaque, parafrontals and parafacials rather dull silvery pollinose, a well defined somewhat bronzy changeable spot opposite basal antennal joints. Width of parafacials opposite second joint about two-thirds distance between oral vibrissae. Mesonotum appearing bluish gray due to rather extensive pruinescence which under different reflections breaks up into eight longitudinal vittae, heavier and somewhat confluent anteriorly. Apical tergite brassy, preceding ones dark bronze with pruinescence. Wings faintly, smoky, darker basally; basicosta dark brown; squamae white. Length 9 mm.; wing 7.5 mm.

The above descriptions of male and female are based on specimens reared from puparia found in the nest of a brown thrasher, Rosslyn, Virginia, May 20, adults emerged May 29, 1913 (R. C. Shannon). The female was included in the type material of *metallica* whereas the male was determined as "*Phormia chrysorrhea.*" Obviously they are male female of the same species, i.e., *splendida* Macquart. Although the female is probably atypically colored it must be considered as the typical form, it being the form described by Macquart. The distribution of all the subspecies and varieties of *splendida* is given at the end of the descriptions of this species.

Protocalliphora splendida sialia, n. var.

Female: Differs from *splendida splendida* in having the ground color of the entire abdomen deep shining blue. Usually the pruinescence of the mesonotum is less evident and the basicosta is very dark brown. This form is usually determined as *azurea* or *sordida* (*chrysorrhoea, caerulea*).

Protocalliphora splendida hesperia, n. var.

Male and female: Characterized by the dusky squamae and wing bases. The pile is also somewhat longer and usually more bristle-like on mesosternum.

Type.—Cat. no. 26861 U. S. N. M.

Protocalliphora splendida aenea, n. var.

Female: General color bronzy, mesonotum but little shining, abdomen well burnished; squamae and basicosta rather golden.

Type.—Cat. no. 26860 U. S. N. M.

Protocalliphora splendida hirundo, n. subsp.

Male: Forceps noticeably shorter than in *splendida splendida* and the outer ones in consequence broader in proportion to length. Front somewhat broader, the parafrontals well defined upwards until opposite lower ocellus. Basicosta yellowish brown; squamae white.

Female: Parafrontals and parafacials bronzy pollinose, without a well defined changeable spot; abdomen unicolorous; basicosta light brown; squamae white.

Type.—Cat. no. 26859 U. S. N. M.

HOSTS AND DISTRIBUTION OF PROTOCALLIPHORA SPLENDIDA MACQUART, (SENS. LAT).—Varieties *splendida* and *sialia*, reared specimens: 1 ♂, 2 ♀♀ (females: varieties *splendida* and *sialia*) host, brown thrasher (*Toxostoma rufum* L.) Rosslyn, Va., May 29, 1913 (R. C. Shannon); 1♂, 1♀ (female: variety *sialia*) larvae in nestlings of bluebird (*Sialia sialis* L.) Wellesley, Mass., August 10, 1907 (E. F. Everett); 1♀ (*sialia*) larva parasitic on nestling bluebird, Ottawa, Ontario, July 23, 1922 (H. Lloyd); 3 ♂♂, 3 ♀♀ (females, variety *sialia*), host, bluebird, Shawnee, on Delaware River, Pennsylvania, July 31, 1908; 8 ♂♂, 10 ♀♀ (females, variety *splendida*) host, cardinal, East Falls Church, Va., June, 1923 (E. A. Chapin); 2 ♂♂, 2 ♀♀ (females, variety *sialia*) host, robin (*Planesticus migratorius* L.) Ithaca, N. Y. June, 1922 (Shannon and Dobroscky); 30 ♂♂, 28 ♀♀, (*sialia*) hosts, crows and robin, Ithaca, New York, May, July (I. Dobroscky); 2 ♂♂, 4 ♀♀ (*sialia*) host, western horned lark (*Otocoris alpestris*) Koehler, New Mexico, Webster no. 7707 (W. R. Walton).

COLLECTED SPECIMENS: 1 ♀ (*sialia*), White Mountains, New Hampshire (H. K. Morrison); 1 ♂, 1 ♀ (*sialia*) Wellesley, Mass.; 1 ♂, Blue Hills Res., Mass., 1 ♀ (*sialia*) Blue Hill, Mass. (N. Banks); 1 ♂, on solidago, Stafford, Conn., August 24, 1905 (W. E. Britton); 1 ♂ McLean, New York, July 18, 1921 (R. C. Shannon); 1 ♂, Caroline, New York (E. G. Anderson); 1 ♂ Fall Creek, Ithaca, New York, April 26, 1922 (L. S. West); 1 ♂, Farmingdale, Long Island, New York, April 29, 1917 (J. Bequaert); 1 ♀ (*splendida*) Watchogue, S. I., New York, May 10, 1920 (E. J. Burns); 1 ♀ (*splendida*) West Orange, New Jersey (J. Bequaert); 1 ♀ (*splendida*) Robertson, Carlinville, Illinois; 1 ♀ (*splendida*) Milwaukee, Wisconsin; 1 ♀ (*sialia*) top of Las Vegas Range, New Mexico, 11,000 feet, end of June (T. D. A. Cockerell); 1 ♀ (*splendida*), Koehler, New Mexico (W. R. Walton); 1 ♀ (*splendida*) Moscow, Idaho, June 18, 1912 (J. M. Aldrich); 2 ♀♀ (*sialia*) Almota, Washington (A. L. Melander); 1 ♀ (*splendida*) Mt. Hood, Oregon, July 29, 1921 (A. L. Melander); 1 ♂, 2 ♀♀ (*sialia*) Savonoski, Naknek Lake, Alaska, August 1, 1919 (J. S. Hine).

Protocalliphora splendida aenea Shannon and Dobroscky. 3 ♀♀ Franconia, New Hampshire, (Mrs. Annie T. Slosson); 1 specimen, only mesonotum and wings remaining, probable ♀, "from brain of a living fledgling of sparrow kind," Ontario, (And. Halket).

Protocalliphora splendida hesperia Shannon and Dobroscky. A large series of this variety was reared from a number of species of birds in region of Seattle, Washington, summer 1918 (O. E. Plath). 1 ♂, 5 ♀♀, Ainsworth, British Columbia, July 11, 1903 (A. N. Caudell).

Protocalliphora splendida hirundo Shannon and Dobroscky. 35 ♂♂, 29 ♀♀, host, cliff swallow (*Petrochelidon albifrons* Say, many nests examined had dead remains of young), Stratford, Washington, July 4, 1920 (R. C. Shannon).

Protocalliphora hirudo n. sp.

This species (including the three varieties here recognized) is characterized by its smaller size, 8 mm., usually less, the unusually narrow front in both sexes (males always?), absence of the upper frontorbital in the female and the presence of an accessory bristle on the notopleura (except male of *parva*) which is smaller than and located between the usual two. Apparently only of western distribution.

Protocalliphora hirudo hirudo (sensu stricto)

Male: Entirely very dark shining blue; frontal aspect of head broadly oval, flattened on upper half; parafrontals contiguous; parafacials silvery pollinose, a slight trace of yellow present, equal to one-half distance between oral vibrissae; mesonotal vittae very faintly indicated; abdomen entirely shining; forceps very slender; wings and squamae distinctly smoky.

Female: Front about three times as long as broad; mesonotum and abdomen with perceptible pruinescence; wings and squamae smoky. Length 6–7 mm.; wing 6–7.5 mm.

Type.—Male, reared from nestling warbler, Colorado, July 10, 1911, (M. A. Palmer); allotype female (same, both from collection of W. R. Walton); paratypes: one male and three females (kindly loaned by Dr. J. Bequaert) reared from maggots found in sparrow Colorado Springs, Colorado, August, 1916 (W. W. Arnold); one male, two females, Koehler, New Mexico (Webster no. 7707, W. R. Walton).

Type.—Cat. no. 26862 U. S. N. M.

Protocalliphora hirudo parva n. subsp.

Male: Dark shining blue; forceps fairly long and slender; angle in last section of fourth vein not sharply angulated; basicosta light brown; squamae tinged. Length about 6 mm.; wing 5 mm.

Female: Head broadly oval, face but little protruding downwards; front narrow, nearly three times as long as broad; arrangement of frontorbitals abnormal, the upper one, on right side, opposite lower ocellus, upper one on left side absent, lower two pairs irregular in their relation to each other; parafrontals and parafacials somewhat ashy, without well defined changeable spot, at their broadest width, opposite second antennal joint, much less than width between oral vibrissae. Pruinescence on mesonotum extensive, giving a general ashy appearance. Wings as in male; squamae white. Length about 6 mm.; wing 5 mm.

Unfortunately the head is lacking in the male and the abdomen in female.

One male and one female, reared from fledglings, Kansas, (S. W. Williston through Prof. L. L. Adams).

Type.—Cat. no. 26864 U. S. N. M.

Protocalliphora hirudo cuprea n. var.

Female: Characterized by its general bronzy color and yellowish wing bases and squamae (coloration very similar to *P. splendida aenea*) and a pair of distinct pollinose mesonotal vittae. Length 7.5 mm.; wing 7 mm.

Reared from pupa in nest of western robin (*Planesticus migratorius propinquus*) Seattle, Washington (O. E. Plath).

Type.—Cat. no. 26863 U. S. N. M.

SCIENTIFIC NOTES AND NEWS

Dr. H. L. FAIRCHILD, of Rochester, New York, who accompanied the Marsh expedition to Darien, Panama, as geologist, visited Washington recently, returning in advance of the main party. Though none of the "blonde" Indians which were reported to exist in eastern Panama had yet been seen, a large amount of scientific data was gathered, and extensive collections of zoological and ethnological material were made. At the time Dr. FAIRCHILD left the base camp on the Chucunaque River about 50 miles from the coast the party was preparing to leave on a trip far into the interior.

The following officers were elected by the Anthropological Society of Washington at a meeting held April 15: *President*, TRUMAN MICHELSON; *Vice-president*, J. P. HARRINGTON; *Secretary*, JOHN COOPER; *Treasurer*, J. N. B. HEWITT.

PAUL C. STANDLEY, of the Division of Plants, National Museum, returned recently from a five months' trip to Panama and Costa Rica. Mr. Standley collected about 15,000 specimens of plants.

ATHERTON SEIDELL of the Hygenic Laboratory, has gone to Bordeaux, France, as an American delegate to the meeting of the Société de Chemie Industrielle.

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